December 27, 1988

TO: Wayne Hedberg, Permit Lead

FROM: Scott Johnson, Reclamation Engineer

RE: Silver Reef Reclamation Estimate, 5-M Incorporated, M/053/002, Washington County, Utah

Attached is the adjusted reclamation estimate for the Silver Reef Mine. The total amount required, in 1993 dollars is $102,000. This amount covers the complete reclamation of the Silver Reef Mine with the exception of the following areas having acceptable post-mining uses:

(a) the maintenance building;
(b) the main substation, powerlines and poles;
(c) the two monitoring wells;
(d) the main roadway that crosses the mining site (approximately two miles long), and the secondary roadway between the monitoring wells and the maintenance building (approximately one mile long);
(e) the existing fences and gates.

The initial Mining and Reclamation Plan, submitted in 1978, included plans for underground mining operations. I cannot find evidence in the file which indicates underground production or shaft useage. For this reason, all shafts are considered to be pre-law disturbances and the reclamation of these shafts is not included in the bond estimate. Other pre-law mining areas, including the old mill area, are also excluded.

The final Reclamation Plan, submitted in April 1988, also suggests a post mining use for the following, which are not acceptable as proposed:

(a) powder magazine;
(b) secondary roadways (excluding the roads in item (d) above).

The operator proposes to leave these structures in-place for future mining uses. To obtain complete reclamation of the mine site, these structures should be removed. The cost for this removal and reclamation is, therefore, included in the bond estimate.

There are several transformers on the site, none of which have been tested for PCB contamination. The reclamation estimate includes costs for the disposal of transformers and oils with PCB concentrations greater than 500 ppm. If the operator has these transformers tested, and the results indicate a PCB concentration less than 500 ppm, the surety required could be reduced by as much as $10,000 (1994 Dollars).

Several areas have been cleaned up and reclaimed in 1988. These areas have been assigned a revegetation cost, pending the success of reclamation performed last spring.

jb
Attachment
MN17/25-26

Reclamation Estimate for the SILVER REEF MINE

5-M INCORPORATED M/053/002

Prepared By
Utah State Division of Oil, Gas and Mining
December 27, 1988

Summarized Comparison of Bond Calculations

Description	1984 5-M Calculation			1988 5-M Calculation			1988 DOGM Calculation		
	Acres	$/acre	Total	Acres	$/acre	Total	Acres	$/acre	Total
Roads	20.00	250	5,000				10.7	796	8,520
Substation & Powerlines	0.25	10,000	2,500						5,540
Water Wells and Lines	0.25	4,000	1,000						
Open Cuts	7.25	3,448	25,000	11.8	3,448	40,686	11.8	758	8,940
Leach Pads & Spray Circuits	8.00	1,000	8,000	3.8	1,000	3,800	3.8	3,474	13,200
Stripping Circuit & Asphalt	1.00	6,010	6,010	0.6	6,010	3,606	0.6	7,500	4,500
Low Grade Ore Stockpiles	3.00	667	2,000	2.6	667	1,734	2.6	800	2,080
Maintenance Building	1.00	2,000	2,000						
Powder Magazine			300				0.9	1,156	1,040
Agitation Tanks	0.50	2,800	1,400	0.5	2,800	1,400	0.5	10,000	5,000
Drill Holes	1.00	2,000	2,000				0.2	400	80
Remaining Processing Facilities				6.3	2,000	12,600	6.3	5,408	34,070
Miscellaneous				1.8	1,500	2,700			
Totals	42.25	1,307	55,210	27.4	2,428	66,527	37.4	2,218	82,970
Add Contingency (10%)									8,300
TOTAL RECLAMATION COST (1988 Dollars)							37.4	2,440	91,270
TOTAL RECLAMATION COST (1993 Dollars @ 2.3% Annual Inflation)							37.4	2,727	102,000

Prepared By
Utah State Division of Oil, Gas and Mining
December 27, 1988
Continued

Description	Quantity	Unit	$/Unit	Total Cost ($)
Maintenance Building (Item 1)				
Post Mining Use Acceptable				
Powder Magazine (Item 2)				
Demolish and Dispose of Building	600	Square Feet	0.90	540
Remove Trash	0.9	Acres	100	90
Grade for Uniformity	0.5	Acres	390	200
Revegetate	0.5	Acres	410	210
Subtotal				1,040
Secondary Road Reclamation (Item 3)				
Remove Trash (a)	20.0	Acres	100	2,000
Rip Roads	10.7	Acres	199	2,130
Revegetate	10.7	Acres	410	4,390
Subtotal				8,520
Processing Facilities (Items 4, 6, 8, 9, 10, 11, 12, 13, 14 and 25)				
Dispose of Pachuca Tanks (Item 4)	3	Each	1,000	3,000
Break-up and Bury Asphalt Pad (Item 6)	0.6	Acres	7,500	4,500
Small Transformer Building (Item 8) (b)				
Test for PCB Concentrations	3	Each	100	300
Dispose of Oil	216	Gallons	2.50	540
Carcass Disposal to Landfill	43	Cubic Feet	4.50	190
Transportation Charge	350	Miles	3.40	1,190
Demolish and Dispose of Building	200	Square Feet	0.90	180
Remove Fenceline	160	Linear Feet	1.25	200
Subtotal				2,600

Prepared By
Utah State Division of Oil, Gas and Mining
December 27, 1988
Continued

Description	Quantity	Unit	$/Unit	Total Cost ($)
Heap Leach Pad (Item 9)				
Decommission Heap Leach Pads	3.8	Acres	750	2,850
Remove Trash	3.8	Acres	100	380
Grade Pits to Minimize Erosion	3.8	Acres	390	1,480
Haul Available Topsoil (c)	6200	Cubic Yards	1.25	7,750
Spread Topsoil	3.8	Acres	195	740
Subtotal				13,200
Asphalt Collection Ponds (Item 10)				
Break-up and Bury Pad	1.2	Acres	7,500	9,000
Precipitation Tanks (Item 11)				
Demolish and Dispose of Tanks	4	Each	1,000	4,000
Agitation and Thickener Tanks (Item 12)				
Demolish and Dispose of Tanks		Lump Sum		5,000
Small Rectifier Building (Item 13) (b)				
Test for PCB Concentrations	3	Each	100	300
Dispose of Oil	150	Gallons	2.50	380
Carcass Disposal to Landfill	30	Cubic Feet	4.50	140
Demolish and Dispose of Building	100	Square Feet	0.90	90
Remove Fenceline	60	Linear Feet	1.25	80
Subtotal				990
Cells and Spiral Precipitators (Item 14)		Lump Sum		4,000
Scrap Iron Pile (Item 25) (d)	200	Cubic Yards	15	3,000
Processing Facilities Revegetation				
Grade for Uniformity	7.4	Acres	390	2,890
Revegetate	11.2	Acres	410	4,590
Subtotal				7,480
Processing Facilities Subtotal				56,770

Prepared By
Utah State Division of Oil, Gas and Mining
December 27, 1988
Continued

Description	Quantity	Unit	$/Unit	Total Cost ($)
Open Pits Reclamation (Items 5)				
Remove Trash	11.8	Acres	100	1,180
Grade for Uniformity	11.8	Acres	390	4,600
Revegetate (e)	7.7	Acres	410	3,160
Subtotal				8,940
Main Substation (Item 15) (b)				
Post Mining Use Acceptable				
Test for PCB Concentrations	1	Each	100	100
Dispose of Oil	1,600	Gallons	2.50	4,000
Carcass Disposal to Landfill	320	Cubic Feet	4.50	1,440
Subtotal				5,540
Ore Stockpiles Reclamation (Items 16)				
Grade for Uniformity	2.6	Acres	390	1,010
Revegetate	2.6	Acres	410	1,070
Subtotal				2,080
Monitoring Wells (Item 17)				
Post Mining Use Acceptable				
Powerlines and Poles (Item 18)				
Post Mining Use Acceptable				
Fencing and Gates (Item 19)				
Post Mining Use Acceptable				
Fire Assay Building (Item 20)				
Pre-law Disturbance. Reclamation Encouraged				
Old Mill Site (Item 21)				
Pre-law Disturbance. Reclamation Encouraged				
Doyle Shaft (Item 22)				
Pre-law Disturbance. Reclamation Encouraged				

Prepared By
Utah State Division of Oil, Gas and Mining
December 27, 1988
Continued

Description	Quantity	Unit	$/Unit	Total Cost ($)
Big Hill Shaft (Item 23)				
Pre-law Disturbance. Reclamation Encouraged				
Boreholes (Item 24)				
Revegetate	0.2	Acres	410	80
				=========
Totals				82,970
Add Contingency (10%)				8,300

TOTAL RECLAMATION COST (1988 Dollars)				91,270
TOTAL RECLAMATION COST (1993 Dollars) @ 2.3% Annual Inflation				102,000

(a) Includes 5 acres of roadwork not shown on DOGM map or 5-M bond map (1988). This 20 acre figure comes from the 1984 5-M bond calculation. Although trash is removed from the entire 20 acres, 9.3 acres of main roads will have an acceptable post-mining use and will not be ripped or revegetated.

(b) In accordance with EPA guidelines, all transformers are considered PCB contaminated until sampling indicates otherwise. These costs reflect the handling and disposal of PCB contaminated transformers and oils. A single transportation charge applies to all transformers. To possibly decrease the surety liability for these transformers, immediate sampling of the oil contents is encouraged.

(c) Documents indicate a total topsoil availability of 6200 cubic yards. This available material will all be used on the heap leach pad and spread out to a depth of 1 foot.

(d) Most of the scrap iron has been removed in 1988. Approximately 200 cubic yards remains.

(e) Due to the steepness of highwalls, approximately 65% of pit areas will accept vegetation.

Prepared By
Utah State Division of Oil, Gas and Mining
December 27, 1988
Continued

Cost Parameters Used

621B Scraper (O&O)	140	$/hour
Production	240	Cubic Yards/hour
D-8 Dozer (O&O)	145	$/hour
Production	300	LCY/hour
Speed w/ripper	1	mph
Grading at 6 inch depth	390	$/acre
Rip roads at 1 foot depth	199	$/acre
Labor Only	24	$/hour
Trash Removal	100	$/acre
Farm Tractor (O&O)	67	$/hour
Speed	4	mph
Width of Pass	6	feet

Revegetation Cost per Acre (No topsoil)	Quantity	Unit	$/Unit	Total Cost ($)
Bare Costs				
Fertilizer (18-46-0)	100	Pounds	0.25	25
Seed Mix	23.75	Pounds	6	143
Native Hay Mulch	2	Tons	50	100
Subtotal				268
Application Costs				
Native Hay Mulch (spread by hand)	3.0	Hours	24	72
Native Hay Mulch (disc into ground)	0.3	Hours	67	23
Fertilizer (broadcast by hand)	0.5	Hours	24	12
Seed Mix (broadcast by hand)	0.5	Hours	24	12
Scarify (tractor with chain)	0.3	Hours	67	23
Subtotal				142
Total Revegetation Cost per Acre				410

* Note: Due to lack of topsoil, native hay mulch and fertilizer will be applied prior to seeding.